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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,608	07/23/2003	Gianluca Bollito	Q76067	7606

7590 05/11/2006

SUGHRUE, MION, ZINN, MACPEAK & SEALS, PLLC  
2100 Pennsylvania Avenue, N.W.  
Washington, DC 20037-3202

EXAMINER
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LEE, CYNTHIA K

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 05/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/624,608	BOLLITO ET AL.	
	Examiner	Art Unit	
	Cynthia Lee	1745	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 23 February 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 24-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☒ Claim(s) 1, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2/23/2006</u>   | 6) <input type="checkbox"/> Other: _____                                    |

***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-23, drawn to a fuel cell, classified in class 429, subclass 34.
- II. Claims 24-30, drawn to a method of making a fuel cell, classified in class 29, subclass 729.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product can be made by a method that requires using flexible polymeric material and Kapton ®.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Robert Sloan on 12/7/2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-23. Affirmation of this election must be made by applicant in replying to this Office action. Claims 24-30 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one

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or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Priority***

Acknowledgement has been made of applicant's claim for priority under 35 USC 119 (a-d). The certified copy has been filed on 7/23/2003.

***Oath/Declaration***

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:  
It does not identify the citizenship of each inventor.

***Preliminary Amendment***

The claims filed 7/23/2003 has been placed in the application file and the information referred to therein has been considered as to the merits.

***Information Disclosure Statement***

The Information Disclosure Statement (IDS) filed 2/23/2006 has been placed in the application file and the information referred to therein has been considered.

***Drawings***

The drawings are objected to because the flexible support 21 in fig. 3 is depicted as a layer. However, the flexible support 21 in fig. 2 is depicted as a box. Thus, it is

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unclear whether the flexible support is a substrate enclosed by each fuel cell unit or a structure that encases a plurality of fuel cell units.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

Should the Applicant wish to invoke Markush recitations for claims 13 and 14, the recitation should read "selected from the group consisting of."

In claim 1, the dash on line 10 should be removed.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There are two recitations of "fuel cell" in claim 1. It is unclear if the second recitation refers back to the first recitation. If so, it is unclear how "at least one ... fuel cell" can refer back to "a fuel cell" since the first recitation is singular and the second recitation is plural. Its dependent claims are rejected for the same.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Referring back to the claim 1 rejection above, it is unclear if the Applicants are invoking the 35 USC 6<sup>th</sup> par. or not since it is unclear what the Applicants are defining as "fuel cell" and the specification (pg 6) supports the deliver means and discharge means to define a duct branching off of fuel cells. Best interpretation was used to examine claim 4.

Claims 3 and 8-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is

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followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 3 recites the broad recitation "polymeric material", and the claim also recites Kapton® which is the narrower statement of the range/limitation.

Claims 3, 9, and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation of trademarks renders the claim indefinite because it does not indicate whether the same material made under a different trademark product is equally operational. Moreover, the value of the trademark is lost to the extent that it becomes descriptive of a product.

Claims 15 is are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear of "the pump" is referring "the micro-pump" or not.

Claims 16 is are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 is considered indefinite because the addition of the word "type" to an otherwise definite expression extends the scope of the

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expression so as to render it indefinite. *Ex parte Copenhaver*, 109 USPQ 118 (Bd. Pat. App. 1955).

Claims 20 is are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what the microcontroller is supplying to the superapacitor.

Claims 21 is are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "to a cell of the second part" is unclear whether "a cell" is referring to a previously recited cell or not.

### ***Claims Analysis***

Claim 1 and 11 were considered to have invoked the 35 USC 112 6<sup>th</sup> paragraph as supported by the description of the conducting path on pg. 8 of the specification.

Claims 6 and 7 were considered to have not invoked the 35 USC 112 6<sup>th</sup> paragraph because the "means plus function" has been sufficiently modified by structural limitations.

The limitation "made using MEMs technology" has been considered but was not given patentable weight because the courts have held that the method of forming the product is not germane to the issue of patentability of the product itself. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

### ***Claim Rejections - 35 USC § 103***



The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 11, 12, 14, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) in view of Maynard (US 6541149).

Pan discloses a fuel cell having a first electrode, a second electrode, and an electrolyte arranged between the first and the second electrode. The assembly is made of a plurality of layers on a flexible substrate. Pan discloses a plurality of cells on the same flexible substrate (fig. 3 and 4). The flexible substrate is Kapton ®.

A first layer of metallic material rests on the flexible substrate and the first electrode comprises an anode catalyst. A second layer of metallic material rests on the electrolyte and the second electrode comprises a cathode catalyst. See fig. 2. A protective layer is present on both sides of the metallic substrate made of Kapton ®. The electrolyte is made from Nafion ®. The means for conducting electrical current to the first electrode and the second electrode are in the form of metallic layers. The catalyst comprises platinum, ruthenium, and osmium [0015]. Conducting paths that electrically connect each cell to the next one is necessarily be present for the series of fuel cell to operate. Pan discloses delivery mean for delivering a fuel cell to each cell and discharge means for emptying water from each cell [0026]. Pan discloses that the flexible substrate is in the form of a ribbon developing in length and is rolled up. See fig. 4. The fuel is methanol in aqueous solution [0031].

Pan does not disclose that the structure is miniaturized. However, Maynard teaches of forming a micro fuel cell for portable electrical devices. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to miniaturize Pan's fuel cell for the benefit of using it for portable electrical devices. Further, it has been held that a modification that would have involved a mere change in the size of a component is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (1955).

Claims 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) as applied to claim 1 above and incorporated herein Narayanan (US 6432284).

Pan discloses all the elements of claim 1. Pan does not disclose that the electrolyte has a composite structure comprising Nafion ® and zeolite. However, Narayanan teaches that Nafion coated with zeolite changes the permeability of Nafion ® and thus, can be used to reduced the crossover of methanol (9:10-20). Since Pan discloses of using methanol as fuel [0026], it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pan and Maynard's fuel cell with Narayanan's Nafion ® electrolyte coated with zeolite for the benefit of reducing methanol crossover. Since zeolite imparts methanol reducing capabilities, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add zeolite to the electrode as well for the benefit of further reducing methanol

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crossover. Pan, Maynard, Narayanan are closely related to applicant's field of endeavor of power generating device using electro-oxidation and electro-reduction.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) as applied to claim 1 above and incorporated herein Hinokuma (US 2003/0013003).

Pan discloses all the elements of claim 1. Pan does not disclose that the catalyst contains carbon materials. However, Hinokuma teaches that fullerene catalyst exhibits superior current density and output characteristics [0018]. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pan and Maynard's fuel cell with fullerene catalyst for the benefit of improving the current density and output characteristics.

Claims 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) as applied to claim 1 above and incorporated herein Shiue (US 6500575).

Pan discloses all the elements of claim 1. Pan does not disclose a control system comprising a micro pump, a microcontroller, and a supercapacitor. However, Shiue teaches a battery with a control system to control air flowing through the batteries. Shiue teaches a piezoelectric micro pump to pump the air through the battery (5:20-50). The system further comprises a supercapacitor as an energy storage device (3:10-20). The system further comprises a control network (5:50-55). Thus, it would

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have been obvious to one of ordinary skill in the art at the time the invention was made to add a control system to Pan and Maynard's fuel cell for the benefit of controlling/regulating the system, such as air, fuel, and water. Shiue is closely related to Pan, Maynard, and applicant's field of endeavor of fuel cells because metal-air batteries are one type of fuel cells.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ckl

Cynthia Lee

  
RAYMOND ALEJANDRO  
PRIMARY EXAMINER